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In the Claims

For purposes of appeal, no claims have been amended, canceled or added.

- 1 1. (Previously Amended) An apparatus for delivering a plurality of chemical
2 vapor deposition fluids to a chamber, comprising:
3 a chemical vapor deposition chamber having a cavity comprising an inlet
4 nozzle, a throat region and an exit nozzle,
5 said inlet nozzle having a first diameter adapted to receive a carrier fluid,
6 and having a first pressure and a first temperature;
7 said throat region, having a first and second end, connected to said inlet
8 nozzle at said first end, said throat region having a second diameter less
9 than said first diameter and adapted to receive said carrier fluid from
10 said inlet nozzle, said throat region having a second pressure lower than
11 said first pressure and a second temperature, and having a first and a
12 second aperture adjacent to said first and second ends for injecting,
13 respectively, a first and a second chemical vapor deposition dopant into
14 said throat region to allow for atomization of said first and second
15 chemical vapor deposition dopants by said carrier fluid and mixing of
16 said atomized first and second chemical vapor deposition dopants with
17 said carrier fluid;
18 said exit nozzle, connected to said throat region at said second end, having
19 an exit pressure lower than said second pressure and a third
20 temperature, said exit nozzle having a third diameter greater than said

21 second diameter to allow for a substantial decrease in pressure from said
22 first pressure to said exit pressure, and configured to introduce said
23 mixed atomized first and second chemical vapor deposition dopants and
24 said carrier fluid in the chemical vapor deposition chamber.

1 2. (Previously Amended) The apparatus of claim 1 wherein said inlet
2 nozzle having said first diameter is adapted to receive and funnel said carrier
3 fluid to said throat region having said second diameter, said inlet nozzle
4 narrowing at an angle in the range of forty to sixty degrees.

1 3. (Previously Amended) The apparatus of claim 1 wherein said throat
2 region is configured to operate at a critical Mach number of 1.0.

1 4. (Previously Amended) The apparatus of claim 1 wherein said second
2 pressure and said second temperature are selected to present a condition for
3 atomization of said first and second chemical vapor deposition dopants.

1 5. (Previously Amended) The apparatus of claim 1 wherein said first and
2 second chemical vapor deposition dopants comprise TEOS.

1 6. (Canceled.)

1 7. (Previously Amended) The apparatus of claim 1 wherein said throat
2 region is configured to maintain said first pressure to be greater than said third
3 pressure to enhance atomization of said first and second chemical vapor
4 deposition dopants.

1 8. (Previously Amended) The apparatus of claim 1 wherein said throat
2 region is adapted such that said second pressure is lower than said first pressure
3 allowing for said first and second chemical vapor deposition dopants to be
4 injected into said throat region.

1 9. (Previously Amended) The apparatus of claim 1 wherein said inlet
2 nozzle is adapted to receive said carrier fluid at a constant flow rate ensuring
3 said second pressure being maintained constant through said throat region.

1 10. (Previously Amended) The apparatus of claim 1 wherein said first and
2 second chemical vapor deposition dopants are introduced simultaneously into
3 said throat region without pre-mixing.

1 11. (Canceled.).

1 12. (Previously Amended) The apparatus of claim 1 wherein said exit nozzle
2 expands to said third diameter from said throat region second diameter at an
3 angle in the range of twenty to forty degrees.

1 13. (Previously Amended) An apparatus for delivering a plurality of chemical
2 vapor deposition fluids to a chemical vapor deposition chamber comprising:
3 a chemical vapor deposition chamber having a cavity comprising an inlet
4 nozzle, a throat region and an exit nozzle,
5 said inlet nozzle having a first diameter adapted to receive a carrier fluid,
6 and having a first pressure and a first temperature, said carrier fluid
7 comprising a process compatible gas selected from the group consisting
8 of O₂, N₂, and He;
9 said throat region, having a first and second end, connected to said inlet
10 nozzle at said first end, said throat region having a second diameter less
11 than said first diameter, and adapted to receive said carrier fluid from
12 said inlet nozzle, said throat region having a second pressure and a
13 second temperature and having a first and a second aperture adjacent to
14 said first and second ends for injecting, respectively, a first and a second
15 chemical vapor deposition fluid into said throat region to allow for
16 atomization of said first and second chemical vapor deposition fluid by
17 said carrier fluid and mixing of said atomized first and second chemical
18 vapor deposition fluid with said carrier fluid, said first and second
19 chemical vapor deposition fluids comprise fluids selected from the
20 group consisting of precursors and dopants; and,
21 said exit nozzle, connected to said throat region at said second end, having
22 said second diameter, said exit nozzle configured to maintain said
23 second pressure and said second temperature, such that said exit nozzle

24 is an extension of said throat region consisting of the same dimensions
25 as said throat region, said exit region configured to introduce said
26 atomized first and second chemical vapor deposition fluid and said
27 carrier fluid in said chemical vapor deposition chamber.

1 14. (Previously Amended) The apparatus of claim 13 wherein said inlet
2 nozzle having said first diameter is adapted to receive and funnel said carrier
3 fluid to said throat region having said second diameter, said inlet nozzle
4 narrowing at an angle in the range of forty to sixty degrees.

1 15. (Original) The apparatus of claim 13 wherein said throat region is
2 configured to operate at a critical Mach number of 1.0.

1 16. (Previously Amended) The apparatus of claim 13 wherein said second
2 pressure and said second temperature are selected to present a condition for
3 atomization of said first and second chemical vapor deposition fluid.

1 17. (Previously Amended) The apparatus of claim 13 wherein said first and
2 second chemical vapor deposition fluids comprise TEOS.

1 18. (Canceled.)

1 19. (Previously Amended) The apparatus of claim 13 wherein said throat
2 region, having said second diameter, is adapted such that said second pressure
3 is lower than said first pressure allowing for said first and second chemical
4 vapor deposition fluid to be injected into said throat region.

1 20. (Previously Amended) The apparatus of claim 13 wherein said inlet
2 nozzle is adapted to receive said carrier fluid at a constant flow rate ensuring
3 said second pressure being maintained constant through said throat region.

1 21. (Previously Amended) The apparatus of claim 13 wherein said first and
2 second chemical vapor deposition fluids are introduced simultaneously into
3 said throat region without pre-mixing.

1 22.-25. (Canceled.)

1 26. (Previously Amended) The apparatus of claim 1 wherein said throat
2 region further comprises a third aperture for injecting a third chemical vapor
3 deposition dopant into said throat region to allow for atomization of said third
4 chemical vapor deposition dopant by said carrier fluid, and allow for mixing of
5 said atomized first, second and third chemical vapor deposition dopants with
6 said carrier fluid.

1 27. (Previously Amended) The apparatus of claim 13 wherein said throat
2 region further comprises a third aperture for injecting a third chemical vapor

3 deposition fluid into said throat region to allow for atomization of said third
4 chemical vapor deposition fluid by said carrier fluid, and allow for mixing of
5 said atomized first, second and third chemical vapor deposition fluids with said
6 carrier fluid.

1 28. (Previously Added) An apparatus for delivering a plurality of chemical
2 vapor deposition fluids to a chamber, comprising:
3 a chemical vapor deposition chamber having a cavity comprising a cross-flow
4 injector, said cross-flow injector comprising an inlet nozzle, a throat region and
5 an exit nozzle;
6 said inlet nozzle having a first diameter adapted to receive a carrier fluid,
7 and having a first pressure and a first temperature, said carrier fluid
8 comprising a process compatible gas selected from the group consisting
9 of O₂, N₂, and He;
10 said throat region, having a first and second end, connected to said inlet
11 nozzle at said first end, said throat region having a second diameter less
12 than said first diameter, and adapted to receive said carrier fluid from
13 said inlet nozzle, said throat region having a second pressure and a
14 second temperature and having a first and a second aperture adjacent to
15 said first and second ends for injecting, respectively, a first and a second
16 chemical vapor deposition dopants into said throat region to allow for
17 atomization of said first and second chemical vapor deposition dopants
18 by said carrier fluid and mixing of said atomized first and second
19 chemical vapor deposition dopants with said carrier fluid; and,

20 said exit nozzle, having an exit pressure, connected to said throat region at
21 said second end for receiving said atomized first and second chemical
22 vapor deposition dopants and said carrier fluid; and
23 wherein said chemical vapor deposition chamber is adapted to receive said
24 mixture of atomized first and second chemical vapor deposition dopants with
25 said carrier fluid from said exit nozzle of said cavity.

1 29. (Previously Added) The apparatus of claim 28 wherein said exit nozzle
2 has an exit pressure lower than said second pressure and a third temperature,
3 said exit nozzle having a third diameter greater than said second diameter to
4 allow for a substantial decrease in pressure from said first pressure to said exit
5 pressure, and configured to introduce said atomized first and second chemical
6 vapor deposition dopants and said carrier fluid in the chemical vapor
7 deposition chamber.

1 30. (Previously Added) The apparatus of claim 28 wherein said exit nozzle
2 has said second pressure and said second temperature, such that said exit
3 nozzle is an extension of said throat region consisting of the same dimensions
4 as said throat region, said exit region being configured to introduce said
5 atomized first and second chemical vapor deposition dopants and said carrier
6 fluid in said chemical vapor deposition chamber.